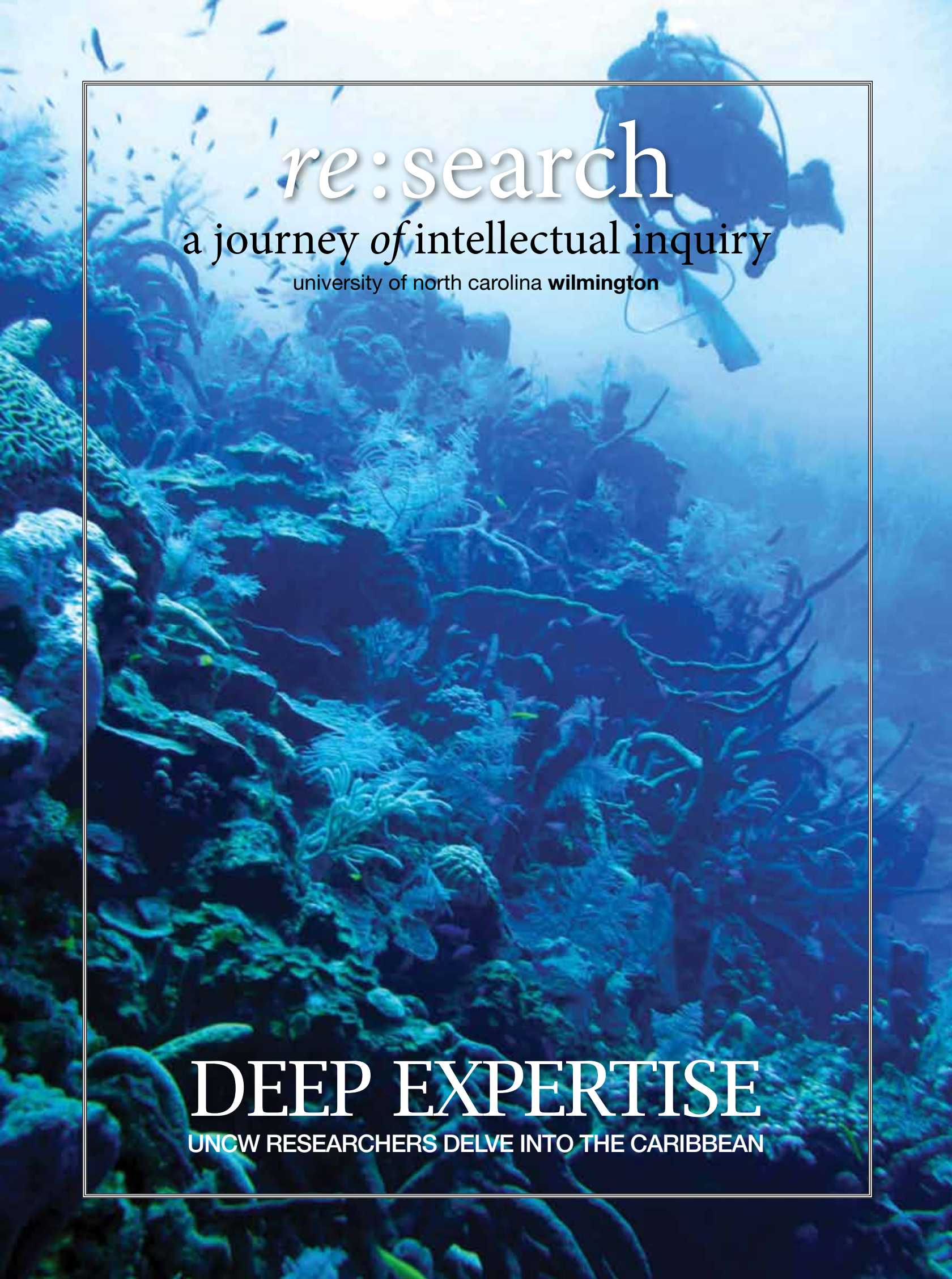


An underwater photograph of a coral reef. In the upper right, a diver in full scuba gear is visible, swimming towards the left. The reef is covered in various types of coral, including branching and table corals. The water is clear and blue, with some light rays visible. The overall scene is vibrant and detailed.

re:search

a journey of intellectual inquiry

university of north carolina **wilmington**

DEEP EXPERTISE

UNCW RESEARCHERS DELVE INTO THE CARIBBEAN

Most of you are now familiar with the research being conducted by UNCW faculty in the coastal region of North Carolina. However, the projects conducted by our researchers range far beyond our state's boundaries and territorial waters.

A little over a year ago, our office put out a call to convene all of the faculty members at UNCW who were engaged in research projects in the Caribbean. We were amazed at

the number who responded and by the diversity of the disciplines and localities that were represented. So, we decided we'd feature some of this fascinating work in this issue of *re:search*.



Robert Roer

We've highlighted the ongoing projects supported by the Cooperative Institute for Ocean Exploration, Research and Technology (a partnership among NOAA, Florida Atlantic University and UNCW) along the coast of Florida and into the Caribbean. Also featured is work on sponges off Florida, archeological expeditions to the Mayan ruins of Belize and research on coral reefs in Curacao.

In an attempt to capture the broad array of projects and places they are conducted throughout the Caribbean region, we constructed a centerfold map for this issue. The result was an impressive display of the reach of UNCW research and its importance in studying our neighboring tropical environments.

The work on coral reefs and associated organisms, like sponges, is particularly relevant to the study of global climate change. The coral reef ecosystems are sites of incredible biodiversity and productivity in the oceans, and they are particularly susceptible to the perturbations associated with climate change.

Climate change is also the topic of an article about a new research professor in our Department of Environmental Studies, **Paul Hearty**, who comes to UNCW with a grant from the National Science Foundation for research into what past geological processes can tell us about current changes in global temperature.

The Caribbean is not the only interesting venue for UNCW researchers. **Ann Pabst** and **Bill McLellan** report on work they've done to conserve the endangered Irrawaddy river dolphin in Southeast Asia. We highlight the exciting new Wildsumaco Research Station in the mountains of Ecuador that was built by Francis Marion University in partnership with UNCW and the discoveries being made there.

This issue features many more examples of research and outreach conducted by our faculty and students. Much of this research would not be possible without the energy, dedication and tireless work of our graduate students, like **Tse-Lynn Loh** who is pursuing her Ph.D. in marine biology (pg. 4) and **Anne-Marie Hodge** (pg. 14-17). The success of the research endeavor at any university depends upon its ability to recruit and retain the best and brightest graduate students. As state funds continue to decline, it is increasingly difficult for UNCW to assemble competitive financial packages to attract the most outstanding graduate students from across the nation. We seek your help to provide support for the well-being of our graduate programs. Please visit www.uncw.edu/advancement to see the opportunities that are available.

Thank you.

A handwritten signature in black ink, appearing to read 'Robert Roer'.

Robert Roer

Dean of the Graduate School



re:search a journey
of intellectual inquiry

*to explore or examine
in order to discover*

Fall 2011/Spring 2012

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re:search

a journey of intellectual inquiry

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For the researchers from the University of North Carolina Wilmington, the Caribbean is no vacation. From studying ways to prevent the decline of the region's coral reefs to providing medicine to poor villagers to unearthing the history of vanished civilizations, the university's faculty, staff and students have spent decades expanding the world's understanding of the region and finding ways to improve the lives of its residents and the health of its ecosystem.

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UNC Wilmington and Francis Marion University in South Carolina have partnered to establish a research station in the remote jungle of Wildsumaco in Ecuador. The Wildsumaco Research Station provides researchers with a home base for studying the diverse ecosystem that provides a home to thousands of species of insects, birds and mammals, including several species of wild cats.

20 RE:SEARCH INTO RESILIENCY

Psychology professor **Antonio Puente** studies the connection between patients' self-image and their ability to respond to change. The founder and co-director of the low-cost Mental Health Clinic at the Cape Fear Clinic in Wilmington, Puente is working at the forefront of integrated mental health services, using the science of psychology to incorporate mental health treatment into the traditional healthcare professional.



24 SPRING BREAK IN BERMUDA

UNC Wilmington students have been given the opportunity to study on the Bermudan island of St. George thanks to a grant from the Gillings family. For the past six years, the donation has allowed students to take a 10-day field course at the Bermuda Institute of Biological Sciences studying alongside students from the United Kingdom's University of Southampton's School of Ocean and Earth Science. The experience is designed to give students a first-hand experience of what it means to become a professional researcher.

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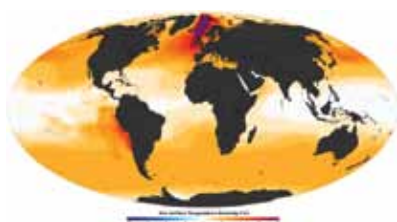
THE ROCK WHISPERER

by William Davis '08M



Paul Hearty examines a Pliocene fossil discovered in Western Australia.

Earth is warming. Determining what this will mean for future generations is one of the greatest challenges in modern science, and UNCW environmental studies professor **Paul Hearty** has been tapped as one of a world-class team of scientists working to provide answers to this question.



**UNCW
PROFESSOR
AND PRINCIPAL
INVESTIGATOR
ON MAJOR
CLIMATE CHANGE
RESEARCH
SHARES
\$4.25 MILLION
NSF GRANT**

Hearty is one of five principal investigators on a grant to build a comprehensive model of past climate change by integrating elements of the world's crust, oceans, atmosphere and ice sheets using fossil and geological data from an ancient warming period 3 million years ago. The National Science Foundation (NSF) has funded the five-year study for \$4.25 million, a rare achievement in an age when basic research budgets have been drastically cut.

Approximately 3 million years ago, the Earth was warmer. Global average temperatures were 2-3° Celsius (3.6° F to 5.4° F) greater than today. Known as the Mid-Pliocene Climatic Optimum (PLIOMAX), this interval has received renewed attention by researchers because its temperatures and composition of the atmosphere are similar to those predicted by global climate change models for the coming century.

"We have to go back 3 million years to find CO₂ (carbon dioxide) levels of 400 ppm (parts per million). Our atmosphere, now at about 393 ppm, will easily reach 400 ppm by the end of this decade," said Hearty.

Over the next five years of the grant, the PLIOMAX team will tackle three major problems in climate science. In the first phase, they intend to use fossil and geological data collected at sites across the world to build a greatly improved database of sea levels and thus ice sheet behavior during the Pliocene.

"Geology has to drive this process. Geology provides first-hand information about the position and movements of sea level," said Hearty.

In a subsequent phase of the project, this data will feed into a series of experiments that will provide estimates of the global sea level under a variety of climate change scenarios. From this work, the team also intends to build a high-resolution comprehensive model of the world's atmosphere-ocean-ice sheet/shelf systems. The ultimate goal of the project is to better forecast the potential behavior of sea levels and ice sheets in a warmer world.

For climate researchers, the Mid-Pliocene represents the last great warm period in Earth's history. As the era's climate roughly resembles the late 21st century projected by

the United Nation's Intergovernmental Panel on Climate Change, it has drawn extensive academic interest in recent years. Agencies such as the U.S. Geological Survey and the British Geological Survey have begun major efforts to construct data models from this period.

While there is general agreement about the temperatures of the Pliocene, controversy exists about the extent to which its warmer temperatures and higher carbon dioxide levels affected global sea levels. Researchers agree that sea levels were higher during the Mid-Pliocene, but the magnitude of the rise has been hotly debated. Researchers' estimates have ranged from 10 meters (32 feet) to around 40 meters (131 feet) higher than today. Higher sea levels are directly tied to the melting of the world's polar ice sheets such as Greenland and Antarctica.

Hearty is hesitant to make predictions based on the past. He acknowledges the complexities of predicting the future through studying geological and modeling data. Climate science deals with a massively complex system, and the variables that led to sea level rise 3 million years ago included more than simple temperature and CO₂ relationships.

Even so, the most conservative estimates of sea level rise during the period would, if repeated in a warming future, dramatically change the shape of the world's coastlines. On a geological scale measured in millions of years, the ocean has risen and fallen many times due to climate change. Hearty said important geological evidence of this can be found throughout Southeastern North Carolina, which once was submerged beneath the ocean.

Hearty will serve as one of the principal investigators on the grant, a prestigious spot on a project featuring an all-star team of researchers from the top universities in the United States. The project's leader, professor Maureen Raymo of Columbia University, is recognized as a global leader in the field of paleoclimatology and paleoceanography. She and the other members of the team, working jointly in various combinations, have published widely on climate change in the Pliocene.

Hearty has worked and published with the team for years, including leading a field expedition in Australia whose findings provided the rationale for the larger study.

Raymo praises Hearty's fieldwork skills, calling him one of the best in the world at interpreting sea level changes from analyzing the rocks and fossil data.

"Paul is an amazing field geologist with decades of experience looking at the coastal record of sea level change. I call him 'The Rock Whisperer,'" said Raymo.

The grant's other principal investigators – geoscientist Rob DeConto from the University of Massachusetts-Amherst, physicist Jerry Mitrovica of Harvard and earth scientist David Pollard of Pennsylvania State University – all have world-class reputations in their fields. In recommending the grant for full funding, the NSF reviewers cited the vast expertise of the team as a major factor in the decision.

Hearty's role will be to lead field expeditions collecting the fossil and geological evidence that will make up the raw data used by the ice and crustal modelers. One of the chief hurdles in accurately modeling the past and future behavior of global climate has been a lack of sea level data.

The PLIOMAX team has already provided solutions to some of the period's greater mysteries. In examining past glaciations and interglacials, they determined that not only will the levels of the oceans rise when the ice melts, but the earth itself will slowly respond when relieved of the pressure of millions of tons of ice. The deformation of the earth combined with the rising waters has led to some of the large discrepancies in findings of past studies.

"You can load kilometers of ice on a continent, and as the ice disappears, the continent rebounds hundreds of meters," said Hearty.

Resolving this controversy is of more than academic interest. The world's governments will need accurate projections to plan for a world of rising seas. In recommending that the study receive full funding, the NSF's review panel praised the research's strong societal relevance.

To collect this data, Hearty and other members of the PLIOMAX team gather samples and precise measurements from regions that share common traits: coastal regions located in

tectonically stable areas far from tectonic plate boundaries. The team has already gathered data in Australia, will travel to South Africa this year and have planned research expeditions to India, Madagascar and throughout the Southeastern United States.

Much of this research would have been impossible little more than a decade ago because of the vast amounts of manpower and time that it would have taken to collect the data. With tools like differential GPS units that are topographically accurate within a few centimeters and Google Earth images, the team can accomplish research in a single day that would have taken much longer in past years.

"Armed with a laptop and a GPS on your dashboard in real time, you can track yourself and potential outcrops on a digital geologic map," said Hearty.

Hearty trusts the final results of the study will prove valuable in the future. By understanding the response of nature to past global changes, he hopes that future generations will be better prepared to deal with the anticipated effects of climate and sea level changes.

"None of us think that in our human lifetime or even over several generations, sea level is going to rise 25 meters," said Hearty.

But it will rise. It has in the past, and it will again in the future. Hearty says that addressing these changes will be one of the major challenges of the world's future leaders.

"We're tinkering with a natural machine we don't understand," said Hearty. ■



GRADUATE STUDENT PROFILE

NOTES FROM THE UNDER(WATER) WORLD SO YOU WANT TO BE AN AQUANAUT?

by Tse-Lynn Loh '12 PhD

In August 2010, **Chris Finelli**, chair of the University of North Carolina Wilmington biology and marine biology department, together with **Tiffany Lewis '11M**, **Steve McMurray '08M** and I embarked on an adventure – we were training to be aquanauts!

The Aquarius habitat is an underwater laboratory and living space where researchers can work and live during 10-day missions. Owned by the National Oceanic and Atmospheric Administration and operated by UNC Wilmington. Aquarius is located at Conch Reef off Key Largo, Fla., and sits at a depth of 60 feet, with living quarters at 45 feet.

As you can imagine, working out of an underwater habitat opens up a new realm of possibilities with regard to scientific diving. We did not surface during those 10 days and were effectively saturated (with nitrogen) after 24 hours. As long as we did not dive shallower than 45 feet, we did not need to worry about decompression and could stay out diving for long periods of time. A typical workday was six hours of diving in the morning followed by another two and a half hours in the afternoon.

Before we could descend, though, we had to undergo some rigorous training by the experienced instructors at the Aquarius Reef Base. As aquanaut candidates (you only become full-fledged aquanauts when you get saturated), we had to get familiar with the technical aspects of saturation diving as well as our dive rig – two 125-foot tanks attached to a wing with 55 pounds of lift and a multitude of straps and attachments. The tanks were so heavy I did not require any additional weights to dive. They definitely took some finesse to deal with, especially on days with rough seas.

We were also put through our paces for the safety and skills aspect of training. We were repeatedly told that “the surface is not an option” while saturated and went through several drills to ensure that we could find our way back to the habitat at all times. All of the things we take for granted on regular dives – ascending in case of a lost buddy, not finding the dive boat underwater, problems with dive equipment, etc. – were no longer options.

The most memorable drill consisted of searching for a “missing” excursion line and finding our way back to the habitat, all the time with our masks off. Yes, even if our masks were to get knocked off underwater, we would have to swim back maskless rather than surface and regroup.

My eyeballs and I were certainly glad to pass the aquanaut boot camp and get on with work.

We descended into the habitat after one week of training with our two super “hab techs” who ensured our underwater survival and sanity. This mission was part of a collaborative effort between Finelli and Joseph Pawlik of the biology and marine biology department to study Caribbean sponge ecology. Finelli and Tiffany were interested in studying the water-filtering capabilities of coral reef sponges, especially the giant barrel sponge *Xestospongia muta*. Steve and I were setting up a caging experiment to monitor predation effects and the growth of sponges at different depths on the reef. We also maintained and collected data from a series of long-term sponge plots.

A big advantage to working from Aquarius was the vast amount of bottom time we got. With eight and a half hours of work time every day, the four of us could accomplish in a few days what it would take a full lab crew weeks to do.

We often get asked, “What is it like underwater?” It was usually pretty busy. Eight and a half hours of diving did not include setting up and preparation time. We were always glad to come in for our midday quiet-time or nap between dives.

Food was prepared in foil pouches with the hot water tap or the microwave. No open flame was allowed due to the higher partial pressure of oxygen in the habitat. We quickly became well acquainted with the various flavors of freeze-dried camping food. Space was at a premium, and the nightlife options limited.

After a couple of days in the laboratory, we also got used to the webcams monitoring our activities (and signs of life) 24 hours a day. It was interesting to get a Facebook message about me applying rash cream on my legs!

What about entertainment? With the abundant sea life around the habitat, we did not miss television at all. Nighttime brought the giant groupers that hunted yellowtail snappers outside the galley viewport.

At the end of the mission, we were happy to ascend once more and breathe in “regular” atmospheric air, but it was with an air of wistfulness that I said goodbye to Aquarius and swam out to the surface. ■

To read more about this research visit:

http://aquarius.uncw.edu/missions/2010/08_2010/expd

UNDERGRADUATE PROFILE

by Sally J. Johnson '14MFA



Olga Pylaeva

When **Olga Pylaeva '11** moved to the United States from Moscow at the age of 13, she knew she wanted to be a doctor.

"I never decided to go into medicine. It was just something I felt all my life," she said.

Pylaeva, a biology and marine biology major, credits the University of North Carolina Wilmington for helping her attain her goal of attending medical school.

In her four years at UNCW, Pylaeva was able to perform her own research, travel to and volunteer in developing countries and achieve recognition for her contributions. Her decision to attend UNCW was "one of the best of my life so far," she said.

While many universities reserve direct research, lab work and publication for graduate and doctoral students, UNCW strongly encourages undergraduate involvement. Working with Sonja Pyott, assistant professor in biology and marine biology, Pylaeva was able to pursue groundbreaking work in human biology.

Pylaeva researched sodium and potassium exchange in the vestibular apparatus, the structures in the inner

ear responsible for balance, control of the orientation of the head and stabilization of visual fields. These structures are very important since loss of their functions "can result in hearing loss and vertigo and the inability to carry out normal tasks like walking or reading," according to Pyott.

The research is the first of its kind in the vestibular apparatus, said Pyott. Pylaeva's work is vital to understanding how sodium-potassium pumps function in the inner-ear organs and could pave the way for other researchers and doctors to develop vestibular implants or treat vestibular disorders. Pyott says Pylaeva's research "has very important consequences on how these structures within the inner ear function."

Pylaeva plans to have this work in print by the end of the year with Pyott's aid.

In addition to her work in the lab, Pylaeva was an active and involved student with a 4.0 GPA. In 2009, she volunteered at a local hospital but was unsatisfied with how little she could do to help.

"I could only give people a blanket in the waiting room," she remembers, because she wasn't a doctor or a nurse. "That wasn't enough. So I went to get my CNA license [that summer]."

She founded the Global Health Brigade chapter at UNCW, planning and fundraising for its first trip to Honduras in December 2010.

She also received the 2011 scholarship awarded to aspiring physicians by the New Hanover-Pender County Medical Society.

Spring semester 2012 Pylaeva started classes at the Brody School of Medicine at East Carolina University. ■

DARE TO SOAR

FROM CURRITUCK BANKS TO BALD HEAD ISLAND

by Emily Jones '09, '10M

"I like trees because they seem more resigned to the way they have to live than other things do." — Willa Cather

Ecologically rich and breathtakingly beautiful, maritime forests in North Carolina shelter barrier islands and the mainland from storm damage, provide a habitat for countless plants and animals, retain moisture and recharge aquifers. However, as important as they are, only 10 percent of North Carolina's original maritime forests have survived into the 21st century.

The N.C. Division of Coastal Management surveyed the forests in 1988, but no one had measured the extent of change that took place over the next 23 years. So when **Anthony Snider**, assistant professor of environmental studies at the University of North Carolina Wilmington, met environmental studies student **Graham Jones '10**, an idea that Snider had locked away for years was set free: a research project to update the data on the loss of maritime forests along North Carolina's barrier islands.

"I kept the idea in the back of my head, and when I joined UNCW's environmental studies department, I waited for a student with sufficient interest and the ability to conduct the research. Graham Jones fit the bill perfectly," said Snider.

The existing baseline study provided a complete geographic assessment with specific surveys of historic and then-current forest use, including plant species, topography, site disturbance and ecological significance as well as applicable land management and forest preservation regulations. Snider's hope was to bring the original study up to date.

Limited resources forced him to put the idea on hold until he came to UNCW in fall 2007 and met Jones. Eager and excited, Jones enrolled in a directed individual study (DIS) course with Snider designed to revisit the 1988 study.

"I wanted to work on this project because maritime forests have continued to disappear for the last 23 years and are still

being depleted at an alarming rate. Hopefully the study will help to create plans to preserve the forests," said Jones.

A DIS involves investigation beyond what is offered in existing courses. It encourages students to take the knowledge they have gained in the classroom and apply it with the guidance of experienced faculty members. UNCW's philosophy is that such student/faculty partnerships are crucial to the undergraduate education experience.

"The culmination of the student learning experience is independent study and applied learning. Putting what they have learned in the classroom into action in the 'real world' is why students are in school. Faculty mentorship is critical to this process. Without faculty direction and experience, the value of the individual study would be diminished," said Jack Hall, environmental studies department chair.

Listed as a globally imperiled ecosystem by The Nature Conservancy, the state's maritime forests have been severely diminished by development. The 1988 study listed 24 maritime forest sites of 20 acres or more on North Carolina's barrier islands with a combined total area of 12,628 acres. Preliminary results of Snider's and Jones's project show that only 18 of the original sites, equaling 11,180 acres, remain.

Jones and Snider hope their study will support keeping protective measures in place for the state's remaining maritime forests. The information will help land managers and legislators make informed decisions about the need for preserving and restoring this unique habitat.

"In the face of increasing sea level rise and storm intensity associated with climate change, ensuring the persistence of barrier islands is the surest means of protecting the coast of North Carolina," Jones said. "Protecting and extending the maritime



Anthony Snider and Graham Jones

Maritime forests are...

- true forests
- influenced by salt spray
- stable through high winds, poor sandy soils and occasional salt-water inundation
- dominated by live oak and sand laurel oak
- present on stabilized sand dunes, dune swales and sand flats
- constantly succeeding and regenerating
- home to many rare and endemic species
- threatened by climate change and human development

forests is the most effective means of doing so."

Jones graduated from UNCW in December 2011 and plans to continue his studies at the master's level. With the help of a grant from the University of North Carolina General Administration, he and Snider plan to continue their research not only on the 18 remaining maritime forest sites, but also at the six sites lost since the original study. ■

UNCW PROFESSORS WORKING TO PREVENT EXTINCTION OF RARE RIVER DOLPHIN

by Brian Burch, University Relations Intern

Professor **Ann Pabst** and **William McLellan** from the University of North Carolina Wilmington have been working with Southeast Asia's biologists, conservationists and government officials to find ways to save a marine mammal whose population has fallen below 100 living members – the Irrawaddy river dolphin. Native to Southeast Asia's Mekong River, the world's 10th longest river, this genetically isolated population could potentially be the next mammal to become extinct.

McLellan was sought out by the World Wildlife Fund to review historic stranding cases of the Cambodian Irrawaddy river dolphin based on his experience with strandings in North America. McLellan and Pabst coordinate the Marine Mammal Stranding Program within the UNCW's Department of Biology and Marine Biology. This program consists of students and researchers who respond to and investigate strandings along the North Carolina coast.

"These strandings provide a window of opportunity to help understand how these mammals make a living. If the marine mammal is found dead, we aim to figure out the cause of death," said Pabst.

Along with undergraduates and graduate students from UNCW, Pabst and McLellan attended the International Marine Mammal Conference in November 2011. McLellan attended a meeting concerning the current status of the Irrawaddy river dolphin where the working group decided it would be beneficial to travel to Cambodia during the middle of January 2012. They saw the trip as an opportunity to analyze long-term stranding data to look for trends and offer suggestions for future field techniques.

"The Cambodia trip helped gather people with different levels of expertise to collaborate over this issue," explained Pabst. While on the trip, they found that fishing nets in the Mekong River were entangling the adult dolphins. McLellan added, "Fishing net entanglements are a common occurrence found during the stranding work."

At the 2012 conference, government agencies signed a declaration for commitment in conserving the species. The Mekong River is a major trading route that links several countries and provides a majority of the public its main source of protein. The Cambodians have agreed to help prevent extinction of species by opening themselves to new innovative ways of fishing.

"The declaration laid out the future of science by help of a broad international community. We saw this as an opportunity in trying to save the species before extinction," said McLellan. ■



CIOERT

by Sally J. Johnson '14MFA

For the past three years, the University of North Carolina Wilmington has partnered with the federal government to develop new technologies and procedures to explore and study the ocean off the Eastern Seaboard.

The Cooperative Institute for Ocean Exploration, Research and Technology (CIOERT) is a program that allows the National Oceanic and Atmospheric Administration (NOAA) to partner with research institutions, including UNCW. Led by Harbor Branch Oceanographic Institute at Florida Atlantic University and based in Fort Pierce, Fla., CIOERT is in its third year of a five-year funding plan from NOAA.

Along with basic and applied science, research and drug discovery, CIOERT is working on several large and long-term projects, including marine biology's **Alina Szmant's** Coral in Situ Metabolism and Energetics (CISME). CISME is a device used to retrieve and record coral metabolic rates without harming the organism. One of the goals of the program is to develop noninvasive research techniques that allow scientists to study organisms without damaging them.

The CIOERT research led to the creation of a probe, attached to bungee cords, which during a dive can gather information about corals similar to the way a blood pressure cuff does about humans. The device can then transmit this information

to a recording device on shore or on a boat without harming the coral.

Daniel G. Baden, director of the Center for Marine Science at UNCW, said he hopes the scientists working on CISME will soon be able to make the probe smaller, faster and more sensitive. Future CISME prototypes may be able to fully function as remotely operated vehicles (ROVs) or even as small robots fully capable of searching for corals themselves.

These robots, equipped with CISME probes, would be able to roam ocean floors and coral reefs to collect data without any outside help. If made affordably, they would be able to collect enough expansive data to make up a comprehensive and 3-D map of coral health, making it easier for researchers to pinpoint where coral are located and what the effects of their environment are.

CISME is an answer to a problem coral researchers have been facing for a long time. In order to garner information about corals and their metabolic rates as well as oxygen, carbon dioxide and ocean acidification levels, researchers without a CISME device must break off a piece of the organism to take to the lab.

With two years of funding from NOAA remaining, CIOERT and UNCW expect to make strides in research, technology and science and to share these innovations with companies which can produce and market them as new tools used in labs, fields and classrooms. ■

INTEGRATIVE ACTIONS OF THE NERVOUS SYSTEM

by Kim Proukou '06M

The box jellyfish looks like a lovely glass bell, but the transparent hollow of this “sea wasp” is not known for its beauty, but rather its sting.

Richard Satterlie, UNCW’s Frank Hawkins Kenan Distinguished Professor of Biological Sciences, studies the physiology, the functioning systems and organs, of box jellyfish.

In research circles, box jellyfish have been gaining attention for their elaborate, well-functioning “camera-like eyes,” according to Satterlie, but its intricate and varied behavioral responses and physiology are not fully understood and may offer surprising applications.

Satterlie wants to know if the successful, adaptive behavioral control that these jellyfish exhibit “can tell us something important about the evolutionary development of the nervous system.”

If so, this new knowledge would be significant. Better understanding of the nervous systems of all animals, including humans, could lead to a means to preserve and possibly regenerate brain function. While more research is needed, such outcomes could advance disciplines from physiology to psychology and provide important data for new, emerging fields such as cognitive neuroscience and restorative neurology.

“There is a definite need to better understand wider aspects of *cubomedusan* nervous organization and behavior,” Satterlie said. “With such a fragile body form, how did these animals answer challenges to their survival and successfully evolve both as individuals and as a group? In the contest for survival, how did they gain a competitive advantage?”

A National Science Foundation grant award of \$400,081 supports this investigation. The grant will fund educational support and training for two graduate students and one undergraduate. An additional four to five undergraduates are involved through the Honors College and directed individual study. ■



PHOTO / JANE FOX

OUT OF THE CLASSROOM: SCHOOL OF NURSING CULTURAL IMMERSION ADVANCES THIRD-WORLD HEALTH

by Jesse McCarl '12

For the past several years, professor **Jane A. Fox** has led nursing students into El Salvador to provide health care for residents who otherwise would not be able to see a health professional of any kind.

In 2011, for 10 days during their spring break, eight handpicked nursing students traveled to La Libertad, El Salvador, to operate a small clinic with a pharmacy treating everything from rashes, flu, headaches, ear pains, parasites and beyond for five of the poorest communities. In 2012, Fox will return to the region with six students.

These are communities with no electricity or running water. Health care is rare, and word of the opportunity travels fast. Community leaders are contacted ahead of time to prepare facilities for the clinics and spread the news of the upcoming visit.

The line to be treated forms early in the morning and is consistently long all day. During the March 2011 trip, the group served more than 800 patients. For most of the locals, this is likely the only health care they will receive all year.

“The people are very appreciative and patient. It’s different from how the ER operates here. Here people would get frustrated with the waits or the language barrier,” said **Maria Weeg '12**.

Fox has always had a heart for the people of El Salvador; she has been making these trips since 2000, sometimes multiple times a year. In 2004, she received a Fulbright grant to develop a master’s program to educate and train advanced practice nurses there.

The UNCW Cultural Immersion program that sponsors the trips began two years ago. In 2011 and 2012, the program received a \$15,000 grant from the Mary Lynn Richardson Fund. The money was used “to purchase equipment, vitamins, anti-inflammatory drugs and other medications that made this the most successful trip yet. We were also able to provide food for the elderly in the villages.”

The program also is expanding due to a supply drive held by UNCW School of Nursing. In 2011, donations provided 45 boxes of clothing, medications, toiletries and other supplies that were shipped and distributed during the visit.

The core purpose of these trips is to provide health care for those who are not able to receive it elsewhere. However, Fox and her students also collect data for research on long-term development of these areas. The goal is not to create dependency, but provide the opportunity to establish long-term change. The trips are a demonstration of how health care can work efficiently, even when resources are limited. Additionally, data are gathered on how such short-term programs change student’s perceptions of the world and about others who are very different from themselves.

“Students get to think outside the box in terms of providing care,” said Fox. “We learn better efficiency which we can apply to systems back home. We have limited resources and must figure out other options to meet identified needs. It’s innovation that we often don’t need with all the resources available in our more established health care system.” ■

FOR THE LOVE OF RESEARCH: THE STUDY OF LOVE AND ROMANTIC RELATIONSHIPS

by Sally J. Johnson '14MFA

We'd all like to be the star of our favorite romantic movies, knowing just what to say and do in order to impress our date, but there's a lot more to it than showing up and looking nice, even if you are a famous celebrity. There is a science to attraction. To learn more, UNCW's **Shanhong Luo** is researching the psychology of love and relationships.

Luo is conducting numerous studies with her students to prove and disprove common myths about attraction, romance and love. Even as a child, Luo described wanting to know more about "that magical process" of falling in love, and as she started doing research, she wondered if she could find out how it works. She's still not sure, but she's taking steps to finding out.

While Luo is most interested in the early stage of relationships including attraction and partner selection, her students focus on a variety of aspects of romantic relationships. Luo's lab covers a broad list of things inside her areas of interests. Her many studies have included projects involving speed dating, infidelity, perceptual biases, humor, text messaging, effect of attire and much more.

Luo is also focused on the positive aspects of relationships. She mentions that many studies focus too heavily on the ways in which a relationship can go awry but not enough prove hypotheses for how to keep a relationship strong. In this vein, Luo and her students carried out a study researching the positive effects of texting and online communication in a relationship.

The original worry is that with these interactions, face-to-face encounters are ignored and the relationship may suffer, but the hope is that there is also an opportunity to show love through these technological venues. After a two-week study, Luo and her students found there was virtually no difference in the relationships between the students who were instructed to send more affectionate text messages to their partners and those who were not. In a follow-up study, Luo plans to have the students compose their own texts, as she fears the drafts written by the researchers in the previous study may have turned off the partners due to sounding false.

Luo is working with two graduate students and one undergraduate from the Honors College. She has a series of studies designed to test hypotheses based on evolutionary theories of attraction. For example, one study concerns how payment reflects and affects one's expectations and perceptions in the first date.

Luo's studies are conducted primarily using the student population at UNCW, meaning her pool of diversity is limited and so far all her studies have been on heterosexual relationships in which 70-80 percent of the participants are Caucasian and Christian. Luo hopes to broaden these studies by involving community and online samples, but she notes it is good to get an accurate view of UNCW's relationship patterns. One of her ongoing studies is to examine homosexual individuals' ideal partner concepts compared to their heterosexual counterparts.

"We all know the divorce rate is high in America, especially that of remarriages," Luo said.

She thinks this rate would be lower if more care was taken in these two aspects, saying

"breakups and divorces [are caused because] the partner they chose wasn't a good fit."

But, even after a good choice is made, each partner must continue to work on the relationship to stay connected. "When people fail to take care of their relationship, magic no longer works." ■

There are many reasons a relationship may not work, including unfaithfulness, dishonesty, miscommunication, children issues, stress from external factors like money or a death in the family. But, what it all boils down to is two factors: whether or not the initial partner selection was a good choice and the amount of effort both partners are willing to put forth into a relationship.

PHOTO / SHANHONG LUO





DEEP EXPERTISE

UNCW RESEARCHERS DELVE INTO THE CARIBBEAN

Marine biology students under marine biology professor Alina Szmant are working on techniques to collect coral sponges without damaging the organisms. Much of the research was conducted in the waters surrounding the island of Curacao.

PHOTOS COURTESY OF CIOERT



PHOTOS / CIOERT

CORALS AND SPONGES OF THE CARIBBEAN

by Sally J. Johnson '14 MFA

For decades, researchers from the University of North Carolina Wilmington have collected data on the reefs of the Caribbean. Home to corals, sponges, fishes and thousands of other organisms, these reefs draw researchers and enthusiasts alike for their inherent beauty, their importance to the human food chain and medical community, and their ability to break up storms and provide safe beaches on which tourism sites can build.

Coral reefs are among the most diverse ecosystems on the planet and have long been an area of interest to researchers. Although they take up less than 0.1 percent of the ocean floor, coral reefs are home to 25 percent of all marine species.

Of the more than 70 documented species of Caribbean coral, only 15-20 species provide the majority of material for the region's reefs. Thousands of other animals and organisms build the rest of the diverse ecosystems. Reefs are constructed of calcium carbonate secreted by living coral. The corals' exoskeletons provide the building blocks and framework for the reef in which animals can hide, feed and procreate thanks to the safety of the limestone tunnels.

More than a dozen UNCW research teams have active coral research in the region, building on decades of work in the Caribbean by UNCW scientists. The work is diverse, with research focusing not just on the coral, but the species that depend on the reefs and the ways in which the reefs impact the economic and environmental health of the humans in the region.

One of the researchers, **Alina Szmant** has spent decades collecting information on the region's reefs. A retired professor of marine biology at UNCW, she studies coral reproduction and encourages her students to be just as excited about corals as she is. Getting them to see the corals up close is one way to do that, knowing these "eye opening experiences" can change lives and outlooks.

"It's one thing to read about [the corals] in a book, it's quite another to see them up close," she said.

Szmant and her students are also developing methods to study coral cell cultures in labs. In order to see how certain chemicals or water characteristics affect corals, Szmant and her team test cultures

of cells instead of live organisms, just as medical researchers test new medicines or viruses and diseases.

Another new approach Szmant is heading up is the development of an innovative instrument called the Coral in situ Metabolism and Energetics (CISME). CISME can provide researchers the opportunity to check the respiration and photosynthesis rates of corals and reefs without harming the ecosystem or organism.

Traditionally, to test these things, researchers would chisel off a piece of live coral to study it later in the lab. With CISME, researchers can place the instrument over the organism or reef section and test the rates from underwater without damaging any piece of coral or its habitat.

"We are all using and, unfortunately, abusing this planet," said Szmant. ■



Barrel Sponge (*Xenophongia muta*)
Photos courtesy of Christopher Finelli

BIOLOGY STUDENTS STUDY NEW DOMINANT ORGANISM

by Chad Graves '12

Christopher Finelli, associate professor and chair of the UNCW's Department of Biology and Marine Biology, and his students are studying how the giant barrel sponge, *Xenophongia muta*, feeds.

The sponges eat by pumping water through specialized canals in their bodies and filtering out phytoplankton and bacteria. In doing so, they transfer nutrients and energy from the water to the sea-floor. Given the large size and abundance of these sponges, their feeding rate can influence the energy flow within the entire coral reef.

The team's main objectives are to measure the volume of water pumped through the sponges, to describe how feeding changes throughout the life of the sponge, to describe the relationships between feeding rates and environmental conditions and to determine the effects of disease or parasites on sponge feeding.

"The work we are doing with sponges is providing new information about a group of organisms that is increasingly important for the function of coral reefs. Understanding these

processes is critical to advancing the science of coral reef ecology and marine biology," said Finelli.

UNCW has developed a working relationship with the Caribbean universities, which helps the visibility of the department and school in the region.

"The opportunities to study in the Caribbean or bring Caribbean students to UNCW benefits our students by exposing them to locations and cultures that are a bit different than are found in Southeastern North Carolina," Finelli said. "These types of experiences can be transformative in the lives of students as they develop a passion (scientific and otherwise) for the tropical Caribbean."

"Marine biology is a field science. Field work is necessary to understand how these organisms live and how they behave under natural conditions."

For more information on the team's discoveries visit <http://people.uncw.edu/finellc>. For more information about biology and marine biology at UNCW visit www.uncw.edu/bio ■

A large school of silver fish, possibly sardines, swimming in clear blue water. The fish are densely packed and move in a coordinated pattern, creating a sense of movement and depth. The background is a deep blue, suggesting an underwater environment.

Caribbean Research &
Instructional Portfolio

re:search
a journey of intellectual inquiry
university of north carolina **wilmington**



Joseph Pawlik, professor of marine biology, and his team of researchers are studying sponges, animals that are far more prominent than corals in modern reef systems in the Caribbean. Pawlik's team is focused on many aspects of sponge life in the reef including spread of a disease called Sponge Orange-Band (SOB). SOB derives its name from the orange band that develops around a disease sponge and disintegrates the organism. The disease spreads even to the reefs' oldest sponges, felling sponges that have lived as long as 2,300 years.

DEEP EXPERTISE

UNCW RESEARCHERS DELVE INTO THE CARIBBEAN

For the researchers from the **University of North Carolina Wilmington**, the Caribbean is no vacation. From studying ways to prevent the decline of the region's coral reefs to providing medicine to poor villagers to unearthing the history of vanished civilizations, the university's faculty, staff and students have spent decades expanding the world's understanding of the region and finding ways to improve the lives of its residents and the health of its ecosystem.

UNCW and its scholars have extensive experience in the region. Scholars like the Center for Marine Science's **Alina Szmant** – who became one of the first female aquanauts by spending almost a month underwater in the undersea habitat Tektite II off the coast of St. Johns in 1970 – have explored the waters of the region for decades. UNCW's first formal exchange program was with the Universidad Nacional in Heredia Costa Rica in 1989. Since the university first began working in the Caribbean, hundreds of undergraduates – like the archaeology students excavating the ruins of Mayan civilizations in Belize – have received their first hands-on field research experience there.

Located less than three hours of flight time from North Carolina, the Caribbean offers UNCW a unique living laboratory for researchers and students. The Caribbean Sea encompasses more than 7,000 islands and 30 nations or territories – including the Central American nations with coastlines on the sea – providing a unique living laboratory for UNCW. More than 8 percent of the world's coral reefs lie beneath its waters and it is home

to more than 70 species of coral and more than 700 species of reef fishes. The inland ecosystems range from rain forest jungles to arid deserts and offer an astounding biodiversity, earning it a designation as one of Conservation International's biodiversity hotspots. The peoples of the region speak English, French, Spanish, Dutch and a variety of creole languages such as Haitian and Papiamentu.

The university currently has active research underway in more than 24 nations in the region. This map explores many of the projects currently underway. Professors and students from disciplines as diverse as film studies to geology and geography have traveled to the region to research the islands and neighboring Central American nations, their inhabitants and the ecology of the land and surrounding oceans. Data collected by UNCW's researchers are helping map earthquake zones, determine the effects of climate change on native species and track the history of native peoples.

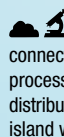
Together with partners like NOAA, the Woods Hole Oceanographic Institute and the Florida Keys National Marine Sanctuary, the university's leadership in Caribbean research played a role in building UNCW's national reputation, especially part of its world-leading marine biology program. Projects like the Aquarius underwater habitat – which the university has operated since the 1980s – the university's commitment to the region will ensure that scholars will continue to enrich the world's understanding of the diverse inhabitants of the region.

■ ANGUILLA

 Mineralogical and petrological variations of prehistoric ceramic shards.

Michael Smith, Geography and Geology
<http://people.uncw.edu/smithms>

■ BAHAMAS

 Meteorological observation network connecting climate data to geological processes, microbiology of inland lakes, distribution of invasive tree species and island water resource development.

Dr. Doug Gamble, Geography and Geology
<http://people.uncw.edu/gambled>

 Assessing the chemical defenses of Caribbean sponges.

Joseph Pawlik, Biology and Marine Biology
Center for Marine Science
<http://people.uncw.edu/pawlikj>

■ BARBADOS

 Economic value of coastal and marine resources.

Pete Schumann, Economics and Finance
www.csb.uncw.edu/people/schuhamnp

■ BELIZE

 Assessing the chemical defenses of Caribbean sponges.

Joseph Pawlik, Biology and Marine Biology
Center for Marine Science
<http://people.uncw.edu/pawlikj>

 Principal investigator on the Maya Archaeometallurgy Project at Lamanai, Belize.

 Archaeology field school at Lamanai and Marco Gonzalez, Ambergris Caye, Belize.

Scott Simmons, Anthropology
<http://people.uncw.edu/simmons>

 Integrated Community-Based Harpy Eagle and Avian Conservation Program for the Maya Mountains Massif.

 Belize Foundation for Research and Environmental Education.

James Rotenberg, Environmental Studies
www.bfreebz.org/
<https://sites.google.com/site/rotenbergj/home>

 Environmental Research Institute, University of Belize.

Martin Posey, Biology and Marine Biology
Center for Marine Science
www.eriub.org/
www.uncw.edu/bio/faculty_posey.htm

 Environmental Research Institute, University of Belize.

Jack Hall, Environmental Studies
<http://people.uncw.edu/hallj/>
www.eriub.org

 Environmental legal issues of onshore and offshore petroleum exploration. Research into laws related to both

environmental protection and funding of environmental efforts through PACT and other entities. Internships in the environmental field, including scientific, management, sustainable business and tourism. Association with University of Belize, Belize Ministry of Tourism and Belize Environmental Research Institute.

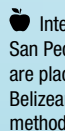
Robert Cutting, Environmental Studies
<http://people.uncw.edu/cuttingr>

 Joint research program in the forest reserves of Belize. Association with Galen University, Belize.

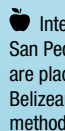
Jeffrey Hill, Environmental Studies
<http://people.uncw.edu/hillj>

 Field course in the Preservation of Mayan art.

Vibeke Olsen, Art and Art History
www.uncw.edu/art/about-olsen.html#du/adharg/home.html

 International Teaching Field Experience, San Pedro, Belize. UNCW education majors are placed in a five-week exchange with Belizean teachers, sharing teaching methods and theory.

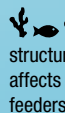
Dennis Kubasko, Instructional Technology, Foundations and Secondary Education
<http://people.uncw.edu/kubaskod/international.html>

 International Teaching Field Experience, San Pedro, Belize. UNCW education majors are placed in a five-week exchange with Belizean teachers, sharing teaching methods and theory.

Susan Catapano, Educational Leadership
<http://people.uncw.edu/catapanos>

 International Teaching Field Experience, San Pedro, Belize. Shooting a documentary film on the Belize/UNCW teacher exchange.

William Bolduc, Communication Studies
<http://people.uncw.edu/bolducw>

 The role of water flow in structuring reef communities and how it affects coral bleaching and reef suspension feeders such as sponges, corals and fishes.

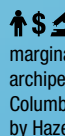
Christopher Finelli, Biology and Marine Biology
<http://people.uncw.edu/finellc>

■ BONAIRE

 Assessing the chemical defenses of Caribbean sponges.

Joseph Pawlik, Biology and Marine Biology
Center for Marine Science
<http://people.uncw.edu/pawlikj>

■ COLOMBIA

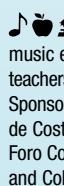
 Recovering and narrating the marginalized history of this Colombian archipelago through an examination of the Columbian novel, *No Give Up, Maan!* (2002), by Hazel Robinson Abrahams.

Christopher C. Dennis, Foreign Languages and Literatures
www.uncw.edu/fll/UNCWCollegeofArtsScience
ForeignLanguagesLiteratures-FacultyDennisC.html

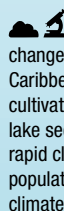
■ COSTA RICA

 Marketing principles immersion field experience in Costa Rica. Partnered with the Costa Rican Humanitarian Foundation.

Lisa Scribner, Marketing
<http://csbapp.csb.uncw.edu/data/fs/vita.aspx?id=8349>

 Research and instruction in music education for K-12 students and their teachers using the Off-Schulwerk approach. Sponsored by the Universidad Nacional de Costa Rica, Universidad de Costa Rica, Foro Costarricense de Educación Musical and Colegio Metodista.

Daniel C. Johnson, Music
www.uncw.edu/music/johnsond

 Late-Holocene environmental change in Central America and the circum-Caribbean. Tracking prehistoric maize cultivation using stable isotope analyses of lake sediments, assessing the impacts of rapid climate change on prehistoric human populations and the impacts of global climate change.

Chad Lane, Geography and Geology
<http://people.uncw.edu/lanec>

■ CUBA

 *Soaring with Fidel*. Following migratory ospreys in the Caribbean.

David Gessner, Creative Writing
www.uncw.edu/writers/faculty_gessner.html

 Cuban film and media.

Mariana Johnson, Film Studies
<http://www.uncw.edu/filmstudies/faculty/johnson-mariana.html>

 Caribbean literature, Afro-Hispanic narrative and contemporary Hispanic literature written by women.

Emmanuel Harris II, Foreign Languages and Literatures
<http://people.uncw.edu/harris/index.htm>

■ CURACAO

 Ecology and geology of Caribbean coral reefs.

Alina Szmant, Biology and Marine Biology
Center for Marine Science
www.uncwcuracaoreefs.blogspot.com
<http://people.uncw.edu/szmanta>

 Ecology of Caribbean coral reefs.

Steve Ross, Center for Marine Science
www.uncw.edu/cms/bio.rosss.htm

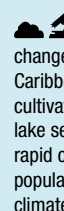
 Ecology of Caribbean coral reefs.

Sandra Brooke, Center for Marine Science
www.uncw.edu/cms

 Assessing the chemical defenses of Caribbean sponges.

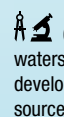
Joseph Pawlik, Biology and Marine Biology
Center for Marine Science
<http://people.uncw.edu/pawlikj>

■ DOMINICAN REPUBLIC

 Late-Holocene environmental change in Central America and the circum-Caribbean. Tracking prehistoric maize cultivation using stable isotope analyses of lake sediments, assessing the impacts of rapid climate change on prehistoric human populations and the impacts of global climate change.

Chad Lane, Geography and Geology
<http://people.uncw.edu/lanec>

■ HAITI

 Geographic Information Systems: watershed modeling, coastal land use development and the impacts on non-point source pollution modeling.

Joanne Halls, Geography and Geology
<http://people.uncw.edu/hallj>

■ JAMAICA

 Online course development partnership at Northern Caribbean University in Mandeville, Jamaica.

Joseph M. Kishton, Psychology

 The historical roots and cultural traditions of Afro-Caribbean religions

Nathaniel Samuel Murrell, Philosophy and Religion
<http://people.uncw.edu/murrells>

 The double exposure and vulnerability of farmers to globalization and climate change in southwestern Jamaica.

Doug Gamble, Geography and Geology
<http://people.uncw.edu/gambled>

 Regional information and communications technology.

Devon Simmonds, Computer Science
<http://people.uncw.edu/simmondsd>

■ MARTINIQUE

 Assessing the chemical defenses of Caribbean sponges.

Joe Pawlik, Biology and Marine Biology
Center for Marine Science
<http://people.uncw.edu/pawlikj>

■ MEXICO

 Assessing the chemical defenses of Caribbean sponges.

Joseph Pawlik, Biology and Marine Biology
Center for Marine Science
<http://people.uncw.edu/pawlikj>

■ PANAMA

 Marine algal diversity of southern Central America: Research training through the development of a Panamanian marine flora.

D. Wilson Freshwater, Center for Marine Science

Gulf of Mexico



Caribbean Research &
Instructional Portfolio



E BAHAMAS
🌴🌴🌴

Atlantic Ocean

Turks & Caicos

HAITI
🏠🌴

DOMINICAN
REPUBLIC
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Puerto Rico
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Virgin Islands
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St. Croix
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Saint
Eustatius
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Anguilla 🌴🌴

St. Martin

ANTIGUA AND BARBUDA

St. Johns 🌴🌴

Guadeloupe

DOMINICA

Martinique 🌴🌴🌴

ST. LUCIA 🌴🌴🌴

ST.
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GRENADA

TRINIDAD AND
TOBAGO
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Aruba

Curacao
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Bonaire
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VENEZUELA
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COLOMBIA
🏠\$🌴



■ PUERTO RICO



Applications of undersea technologies to scientific research. Studies of mesophotic coral reef ecosystems.

Cooperative Institute for Ocean Exploration, Research and Technology
www.cioert.org

Mapping submarine faults to help constrain the seismogenic and tsunamogenic potential of the northeastern North American-Caribbean plate boundary.

Nancy Grindlay, Geography and Geology Center for Marine Science
<http://people.uncw.edu/grindlayn>

Linguistic variation in Spanish-speaking countries of the Caribbean.

Amanda R. Boomershine, Foreign Languages and Literatures
<http://people.uncw.edu/boomershinea>

Reproductive ecology and physiological ecology of reef corals and nutrient dynamics in tropical coastal systems.

Alina Szmant, Biology and Marine Biology Center for Marine Science
<http://people.uncw.edu/szmanta>

Management strategies adopted by NOAA and the Florida Keys National Marine Sanctuary trying to control populations of lionfish, an invasive species, through programs that encourage CATCH and EAT!

Jerome Naar, Center for Marine Science
<http://people.uncw.edu/naarj>

Assessing the chemical defenses of Caribbean sponges.

Joseph Pawlik, Biology and Marine Biology Center for Marine Science
<http://people.uncw.edu/pawlikj>

Sediment records of late-Holocene environmental change and prehistoric records of bioluminescence from coastal lagoons.

Chad Lane, Geography and Geology
<http://people.uncw.edu/lanec>

■ SAINT LUCIA

Assessing the chemical defenses of Caribbean sponges.

Joseph Pawlik, Biology and Marine Biology Center for Marine Science
<http://people.uncw.edu/pawlikj>

■ SAINT EUSTATIUS

Assessing the chemical defenses of Caribbean sponges.

Joseph Pawlik, Biology and Marine Biology Center for Marine Science
<http://people.uncw.edu/pawlik>

■ TRINIDAD AND TOBAGO

Extractive and non-extractive value of marine turtles in Tobago.

Pete Schumann, Economics and Finance
<http://www.csb.uncw.edu/people/schuhmannp>

■ UNITED STATES VIRGIN ISLANDS

Management strategies adopted by NOAA and the Florida Keys National Marine Sanctuary trying to control populations of lionfish, an invasive species, through programs that encourage CATCH and EAT!

Jerome Naar, Center for Marine Science
<http://people.uncw.edu/naarj>

■ ST. CROIX

Marine Research and Education Center. Salt River Bay National Historical Park and Ecological Preserve, St. Croix, USVI.

<http://www.nps.gov/sari/index.htm>



Applications of undersea technologies to scientific research. Studies of mesophotic coral reef ecosystems.

Cooperative Institute for Ocean Exploration, Research and Technology
<http://www.cioert.org>

Mineralogical and petrological variation analysis of prehistoric pottery.

Michael Smith, Geography and Geology
<http://people.uncw.edu/smithms>

Geographic Information Systems: watershed modeling, coastal land use development and the impacts on non-point source pollution modeling.

Joanne Halls, Geography and Geology
<http://people.uncw.edu/hallsj>

The effects of seawater temperature on the physiology and behavior of sea turtles.

Amanda Southwood Williard, Biology and Marine Biology
<http://people.uncw.edu/williarda>

Economic, environmental and social impacts of tourism.

Nancy Hritz, Health and Applied Human Sciences
<http://www.uncw.edu/hahs/NHritz.htm>

Past and present climate of the Salt River Bay watershed.

Doug Gamble, Geography and Geology
<http://people.uncw.edu/gambled>

Past and present climate of the Salt River Bay watershed. Modern and prehistoric bioluminescence in Salt River Bay.

Chad Lane, Geography and Geology
<http://people.uncw.edu/lanec>

Individual and community level knowledge and preparation for tsunamis.

Jennifer Horan, Public and International Affairs
<http://people.uncw.edu/horanj>

Individual and community level knowledge and preparation for tsunamis.

Stephen Meinhold, Public and International Affairs
<http://people.uncw.edu/meinholds>

Effects of ocean currents on reef fish population dynamics. Behavioral interactions of reef fish.

Will White, Biology and Marine Biology
<http://people.uncw.edu/whitejw>

Seawater quality study at Salt River Bay National Historical Park and Ecological Preserve.

Bob Wicklund, UNCW

Seawater quality study at Salt River Bay National Historical Park and Ecological Preserve.

Ron Moore, Center for Marine Science

■ ST. JOHN

Mineralogical and petrological variations of prehistoric ceramic shards.

Michael Smith, Geography and Geology
<http://people.uncw.edu/smithms>

■ UNITED STATES (FLORIDA KEYS)

Florida Bay Fish-Habitat Assessment Program.

Michael Durako, Biology and Marine Biology
<http://people.uncw.edu/durakom>

Effects of ocean currents on reef fish population dynamics. Behavioral interactions of reef fish.

Will White, Biology and Marine Biology
<http://people.uncw.edu/whitejw>

The role of water flow in structuring reef communities and how it affects coral bleaching and reef suspension feeders such as sponges, corals and fishes.

Christopher Finelli, Biology and Marine Biology
<http://people.uncw.edu/finellic>

Functions of unusual organic compounds derived from Caribbean coral reef sponges and sea whips. Ecology of sponges on coral reefs.

Joseph Pawlik, Biology and Marine Biology Center for Marine Science
<http://people.uncw.edu/pawlikj>

Management strategies adopted by NOAA and the Florida Keys National Marine Sanctuary trying to control populations of lionfish, an invasive species, through programs that encourage CATCH and EAT!

Jerome Naar, Center for Marine Science
<http://people.uncw.edu/naarj>



The Aquarius Reef Base mission is to serve as a national asset for conducting marine ecosystem science, long-term ecological studies, coral observatory and sentinel site science, undersea technology development, extreme environment training and outreach and education. The *Aquarius* undersea laboratory, located 4.5 km offshore Key Largo, Florida in 20 m of water, has been operated by UNCW for the National Oceanic and Atmospheric Administration since 1990 and is the main component of the Reef Base.

Thomas A. Potts, Aquarius
<http://aquarius.uncw.edu>



Applications of undersea technologies to scientific research.

Cooperative Institute for Ocean Exploration Research and Technology
<http://www.cioert.org>

■ VENEZUELA

Soaring with Fidel. Following migratory ospreys in the Caribbean.

David Gessner, Creative Writing
www.uncw.edu/writers/faculty_gessner.html

Icons

	Coral		Archaeology
	Fish		Terrestrial Biology
	Sponge		Tsunami
	Weather		Music
	Humanities		Algae
	ROV		Legal
	Geology		Tree
	Economy		Lionfish (Invasive Species)
	Sea Turtle		Water Quality
	Computer		Research
	Map		Teaching



Facilities



Underwater ocean laboratory

Key Largo, Fla.

<http://aquarius.uncw.edu>



Cooperative Institute for Ocean Exploration, Research and Technology

www.cioert.org



The role of water flow in structuring reef communities and how it affects coral bleaching and reef suspension feeders such as sponges, corals and fishes.

Christopher Finelli, Biology and Marine Biology

<http://people.uncw.edu/finelli>



Functions of unusual organic compounds derived from Caribbean coral reef sponges and sea whips. Ecology of sponges on coral reefs.

Joseph Pawlik, Biology and Marine Biology,

Center for Marine Science

<http://people.uncw.edu/pawlikj>



Identification of the climatic processes associated with the Caribbean mid-summer drought.

Doug Gamble, Geography and Geology

<http://people.uncw.edu/gambled>



Examination of energy flow and relationships to animals to deep coral banks, canyon systems and rocky areas.

Steve Ross, Center for Marine Science

<http://www.uncw.edu/cms/bio.rosss.htm>



Pre-colonization to modern era Caribbean history with a specific focus on the Age of Sail.

William McCarthy, History

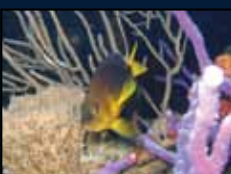
<http://people.uncw.edu/mccarthyw>



Phylogenetics, biogeography and floristics of western Atlantic and Caribbean marine algae.

D. Wilson Freshwater, Center for Marine Science

<http://www.uncw.edu/cms>



Speciation and population genetic connectivity of *Hypoplectrus* coral reef fishes.

Michael McCartney, Biology and Marine Biology,

Center for Marine Science

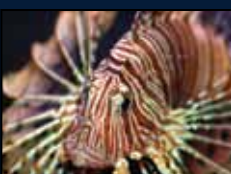
<http://people.uncw.edu/mccartneym>



Operations of remotely and autonomously operated vehicles. Region-wide support including multibeam bathymetry, fisheries, geo-referenced habitat documentation, instrument recovery and specialized instrument deployment.

Lance Horn, Center for Marine Science

<http://www.uncw.edu/cms>



Management strategies adopted by NOAA and the Florida Keys National Marine Sanctuary trying to control populations of lionfish, an invasive species, through programs that encourage CATCH and EAT!

Dr. Jerome Naar, Center for Marine Science

<http://people.uncw.edu/naarj>



Archaeology field school provides students with hands-on experience excavating and cataloging artifacts from indigenous Caribbean peoples.

Scott Simmons, Department of Anthropology

<http://people.uncw.edu/simmonss/>

UNCW Caribbean Research Supported by:





PHOTO COURTESY OF SCOTT SIMMONS

AMBERGRIS CAYE, BELIZE

by William Davis '08M

Students from UNCW assist in the excavation of Maya ruins on the eastern coast of Belize. The field school provides UNCW students with hands-on experience in the tools and techniques of archaeology.

Since 2001 a four-week field school in Belize has provided intense, hands-on exposure to professional archaeology for more than 100 UNCW students. They spend their days in the Belizean sun, under the direction of **Scott Simmons**, Department of Anthropology, painstakingly unearthing and documenting the remains of one of the most complex civilizations of the ancient world.

The primary focus of their work has been in the ancient Maya city of Lamanai and a related coastal trading port on Belize's Ambergris Caye known as Marco Gonzalez. UNCW students take on every aspect of the work, setting up excavation areas, mapping, surveying, creating drawings of artifacts, washing and preserving finds and "all the aspects of lab and field work that we can expose them to," said Simmons.

"The main thing is to train them up to be competent at field archeology and lab work," said Simmons.

Marco Gonzalez is surrounded by a mangrove swamp, and conditions at the Belizean sites are challenging. Students live without air conditioning. Anti-malarial drugs are a must. There are lots of mosquitoes.

"The key point is whether they like to dig. It sounds simple, even obvious, but you are out there in intense conditions," said **Eleanor Reber**, associate professor and chair of the Department of Anthropology. "It's

crucial that they find out whether they like it or not."

Largely untouched by researchers until the 1970s, Lamanai was one of the most enduring Maya cities. Evidence shows continuous occupation for more than three millennia. At its height, the city supported more than 35,000 inhabitants and more than 800 structures, including several Mayan pyramids. The site's 100-foot tall High Temple is still one of the largest structures in Belize.

The city survived the collapse of inland Maya civilization in the 9th and 10th centuries CE and remained inhabited, if diminished, when the Spanish arrived in 1540. Enough people still lived in the city that the Spanish built two successive mission churches at the site. The church and other buildings were destroyed during a Maya revolt in 1638, and the city faded from history.

In 2010, the archaeology field school shifted to Marco Gonzalez, located just south of Wilmington's sister city, San Pedro. Connected to Lamanai by the New River, Marco Gonzalez is believed to have served as a trading hub for the city from 500 CE until at least the 13th century.

Traders from Marco Gonzalez ranged across thousands of miles of the ancient Mesoamerican world, hugging the coastline in canoes that could penetrate deep inland using the region's extensive network of rivers.

Artifacts unearthed at the site have included pottery from the Yucatan and Central America and volcanic obsidian from the highlands of Guatemala and central Mexico.

Simmons has led eight expeditions to Belize, bringing along a dozen to 16 students each time, exposing them both to the work and to peers from across the world. While primarily made up of UNCW undergraduates, students from sister schools like UNC Charlotte and UNC Chapel Hill as well as University College London (UCL) are part of a larger collaborative educational and research effort that includes UNCW and other national and international universities. A former president of the UNCW anthropology club and veteran of the 2010 field school on Ambergris Caye, **Elizabeth Saunders '08**, is now pursuing a Ph.D. in archaeology at UCL, and other former field school students are enrolled in other prominent graduate programs in archaeology as well. Beginning this year, UNCW will be partnering with Belize's Galen University in a public archaeology program that will take place in San Pedro and continue through 2013. ■

This year Simmons is hosting another archaeology field school on beautiful Ambergris Caye. If you are interested in participating, please contact Simmons at 910.962.3429 or simmonss@uncw.edu



Going Where the Wild Things Are

by Joy Davis '06

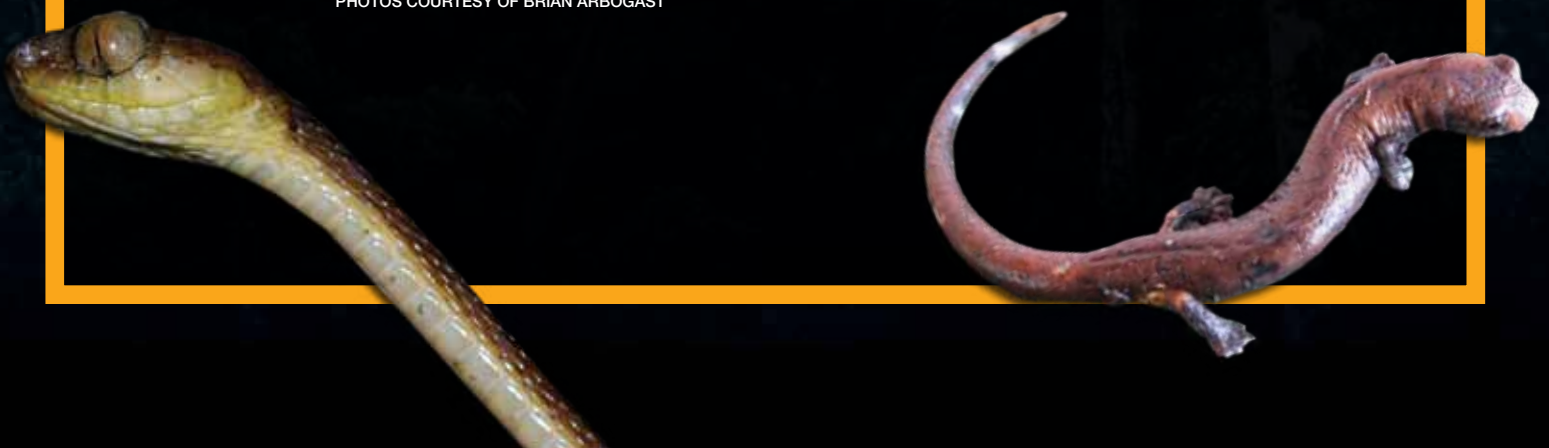
UNCW and Francis Marion University
explore uncharted territory in Ecuador



Deep in the rainforests of Ecuador is a land whose wild sights and sounds have remained virtually untouched by modern civilization – a lush paradise where jungle cats stalk their prey, rare reptiles slither, peculiar insects crawl and more than 500 species of colorful birds soar above.

At close to 5,000 feet in altitude on the east slope of the Andes Mountains, the Wildsumaco Wildlife Sanctuary – site of one of UNCW's newest partnerships – is a hotbed of research opportunities where students are paving the way for their dream jobs and exploring a world beyond their wildest imaginations.

PHOTOS COURTESY OF BRIAN ARBOGAST



Journeying into the great unknown

In 2008, Francis Marion University (FMU) associate professor of biology Travis Knowles invited UNCW associate professor of biology **Brian Arbogast** to explore research opportunities with him in Ecuador.

Knowles said, "Sumaco is one of the richest and most diverse regions on Earth. This biological wealth, coupled with the fact that the region has had very little scientific study, makes it a stunning location for biodiversity and ecological research."

After seeing Wildsumaco for himself that December, Arbogast invited UNCW graduate student **Anne-Marie Hodge** to scout research possibilities in the area. Hodge, who holds a prestigious National Science Foundation Graduate Research Fellowship, decided to pursue a master's in biology at UNCW after learning about Wildsumaco from Arbogast at a research conference.

Hodge said, "The chance to work in an area that hadn't been surveyed before was very exciting. There are researchers with decades of experience who never get this type of opportunity."

The unique wildcats of the Wildsumaco jungle, including the pumas, margays and ocelots, offered Hodge the perfect opportunity to explore her passion for carnivores.

Hodge said carnivores are "the wobbly block at the top of the food chain," noting that while most people view the predators as strong creatures, their survival depends on the health of everything below them, including a large supply of land and food.

"Carnivores are a good indicator of the stability of their environment. The same thing that makes them dominate also makes them vulnerable. If an environment changes, they are the first to suffer."

On her first trip to Wildsumaco in 2009, Hodge installed a system of non-invasive camera traps to study interactions among the diverse creatures of the Ecuadorian jungle. Her cameras captured a reality show of jungle mating, eating and sleeping habits 24 hours a day. The small but deadly margay quickly emerged as the star and became the focus of Hodge's research.

She said, "When I got to the camera footage, it felt like Christmas. We had margays coming out of our ears. We didn't expect to see that. It was a great opportunity because so little is known about them."



Brian Arbogast in front of the Andes Mountains



Anne-Marie Hodge

"Research is an inherently collaborative effort. We rely on the expertise of others constantly. In this case, we have been able to leverage resources collaboratively in a way that we couldn't have done separately. The potential for undergraduate and graduate level student research projects is astounding."

– Anne-Marie Hodge





Golden-tailed Sapphire
Chrysuronia oenone

Average size of about 3.7 inches long

Feeds on nectar from brightly colored tree flowers. They prefer flowers with the highest sugar content.

Hummingbirds have the largest heart in proportion to its body of any animal. They also have the fastest heartbeat and highest metabolism.



Her camera traps were an ideal way to research the margay, an animal which Hodge said is difficult to study because of its small size (30-45 cm. tall), its tendency to hide in canopies and above all its nocturnal predatory habits. According to Hodge, the wide-eyed margays are “on the track to being endangered” due to their sensitivity to forest fragmentation and over hunting. The jungle cat’s smooth, spotted, leopard-like furs are of high value to traders.

Hodge said, “A lot of endangered species are highly studied. It’s really great to examine an animal that almost no one knows about.”

Exploring uncharted territory

Arbogast said, “It was a no-brainer to offer more students the chance to develop projects in Wildsumaco. The research possibilities would be endless. The area had never been inventoried, and we expected to find more and more new and rare species.”

But, there was a problem – the isolated Wildsumaco offered few accommodations for researchers.

On their first trips, students and faculty operated out of the Wildsumaco

Wildlife Sanctuary. Owned and preserved by Bonnie and Jim Olson and their friend Jonas Nilsson, the sanctuary is home to a lodge for bird watching enthusiasts nestled between two Ecuadorian villages. When UNCW and FMU began discussing long-term research possibilities, the Olsons and Nilsson volunteered to inexpensively lease their land so a field station could be built. FMU offered to sponsor the station, and a three-way partnership between UNCW, FMU and the sanctuary was born.

Bonnie Olson said, “We’re excited about being able to help provide an increased number of students with the opportunity to learn firsthand about tropical biodiversity of the Sumaco area. With this knowledge, we hope to better protect it.”

Trailblazing a new frontier

By the time construction on the 2,000-square-foot Wildsumaco Biological Station began in the spring of 2011, Hodge’s labors were yielding significant fruit. In less than two years, she had documented one-third of Ecuador’s terrestrial carnivores within a five-square-kilometer area – the first ever recorded scientific survey of the area’s numerous predators.

“Not only am I getting to study the margay, my camera survey captured the first verified records of several species at the site, including the jaguarundi and ocelot,” said Hodge.

Hodge presented her preliminary findings at last year’s annual meeting of the Society for Integrative and Comparative Biology. She is currently finalizing her graduate thesis, based on her fieldwork in Wildsumaco. She hopes that environmentalists can better protect the margay with the help of her findings about the species’ interaction with its environment.

She said, “The opportunity to work at this site is what brought me to UNCW, and I think having this station will help attract more students in the future.”

FMU and UNCW continue to use Hodge’s 20 camera traps to investigate the biodiversity of Wildsumaco.

The doors to the new Wildsumaco Biological Station opened in January 2012. The simple but comfortable facilities, owned by lead academic partner FMU and maintained by the sanctuary, consist of three buildings, which can house up to 18 people and are equipped with electricity.



"We envision it as a place where multiple cultures will meet, including the indigenous population and faculty and students from all over the world," Arbogast said.

Wildsumaco researchers regularly interact with local Ecuadorian citizens, and have collaborated extensively with scientific colleagues from Pontificia Universidad Católica del Ecuador and Sumaco Napo-Galeras National Park. Although biological research will continue to expand in the area, the station was built with interdisciplinary collaborations in mind. The team hopes Wildsumaco will one day be a hub of research for students and faculty from fields such as social work, education, nursing, Spanish and more. ■

For further info:

Biological station Facebook page:
www.facebook.com/wildsumaco.bio.station

Wildsumaco website:
www.wildsumaco.com



Margay *Leopardus wiedii*

Size ranges from a body length of 19 – 31 inches and tail length of 33 – 51 inches

Weight ranges from 5.7 – 8.8 lbs

Eats small mammals (sometimes monkeys), birds, eggs, lizards, tree frogs and some vegetation

Sometimes called the tree ocelot because of its excellent climbing ability. It is one of the only cat species with the ability to climb head-first down a tree.

Mouse Opossum Believed to be *Marmosa murina*

Size ranges from a body length of 4.3 – 5.7 inches and tail length of 5.3 – 8.3 inches

Weighs around 8.8 oz

Eats insects, spiders, lizards, bird's eggs, chicks and fruits

Most commonly sighted near forest streams and human habitation



Tropical Climbing Salamander *Bolitoglossa* sp.

Size ranges from 45 – 200 mm depending on the species

Eats insects and other invertebrates

Just under half of the species in this genus have webbed feet ideal for swimming, while the rest have more elongated fingers and toes ideal for climbing and clinging to trees

Lanternfly *Phrictus xanthopterus* (male)

Size around 40 – 50 mm

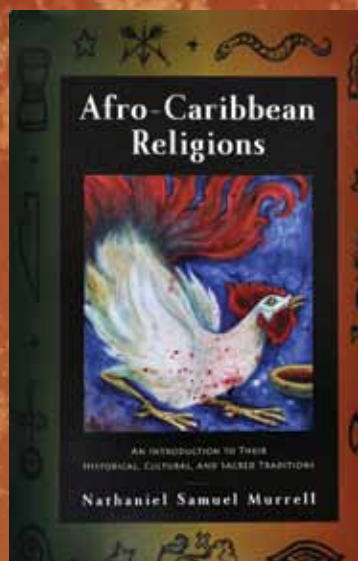
Not a fly, but a planthopper "bug" (family Fulgoridae)

Feeds and lays its eggs on the vegetation of tropical trees

Most species have bizarre head ornamentation, the function of which is not clear. These hollow "snouts" were incorrectly thought to be luminous at night, the origin of the name "lanternfly."



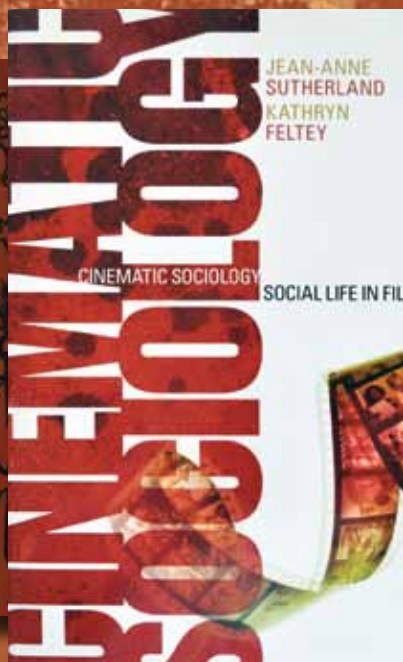
BOOKS, CD AND FILMS



Afro-Caribbean Religions: An Introduction to Their Historical, Cultural and Sacred Traditions

Nathaniel Samuel Murrell,
associate professor of
philosophy and religion
(Temple University Press, 2009)

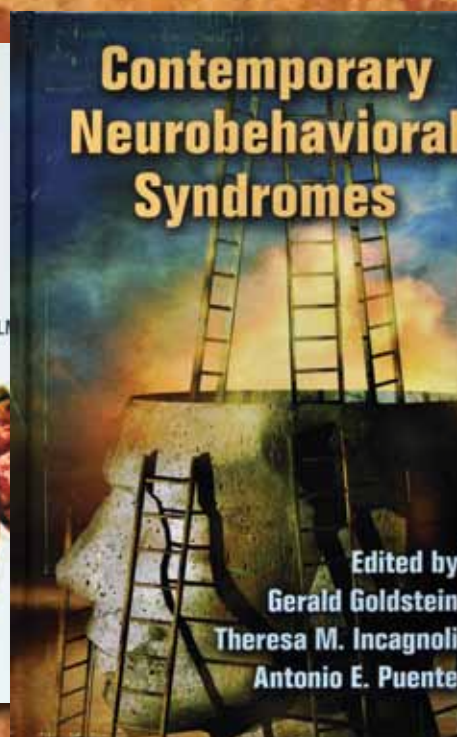
One of the most important aspects of Afro-Caribbean culture is religion, helping link its people to their histories in Africa. Afro-Caribbean religion is also very diverse, including Cuban Santería, Haitian Vodou and Rastafari in Jamaica. Nathaniel Murrell's *Afro-Caribbean Religions* helps uncover the religious traditions in the Afro-Caribbean culture, including beliefs, structures and rituals throughout the Caribbean and Brazil. This introduction is comprehensive and accessible for both scholar and student and includes a glossary of terms and key points.



Cinematic Sociology: Social Life in Film

Jean-Anne Sutherland,
assistant professor of sociology, and
Kathryn Feltey, associate professor of
sociology (University of Akron)
(Pine Forge Press, 2009)

This unique text explores the basic tenets of sociology in popular films, taking readers inside movies to view them sociologically. Essays from the disciplines of cultural studies and sociology discuss film classics like *My Fair Lady* and contemporary comedies like *Forty Year Old Virgin*. These essays provide a way for students to view movies as sociologists, taking into consideration identity, inequality, social institutions and context and gives professors the tools to incorporate these perspectives in their lectures and coursework.



Contemporary Neurobehavioral Syndromes

Antonio E. Puente, professor of psychology, Gerald Goldstein (University of Pittsburgh School of Medicine) and Theresa M. Incagnoli (American Board of Professional Psychology in Clinical Neuropsychology)
(Psychology Press, 2011)

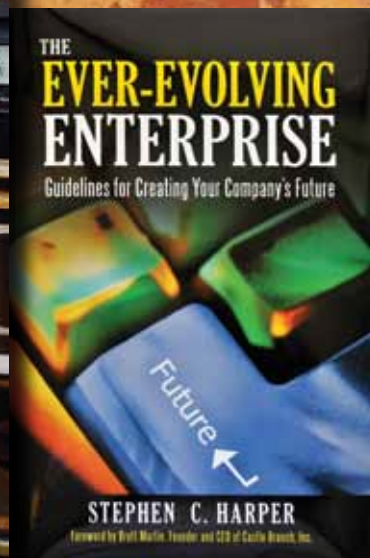
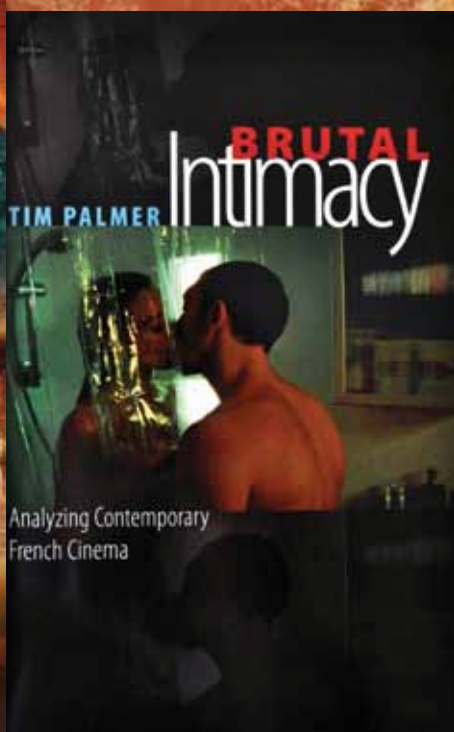
The 20th century saw the first of many new neurobehavioral diseases, whether they appeared the first time or were renamed and reconceptualized. While modern toxins and harmful environments gave way to never-before-seen diseases and syndromes due to exposure, previously established illnesses were being reconsidered in light of new research. These diseases and disorders, including adult ADHD, Lewy Body Dementia and Post Traumatic Stress Disorder, are covered in *Contemporary Neurobehavioral Syndromes*. This book, drawing from expert reviews, gives unbiased coverage of the research findings and discussions of these illnesses and syndromes and provides a resource for researchers, neurologists and concerned patients alike.



Black Hole Sun

David Macinnis Gill, associate professor
of English education
(Greenwillow Books, 2010)

In *Black Hole Sun*, David Macinnis Gill's second novel for young adults, a 16-year-old boy named Durango is living on Mars and must protect South Pole miners from a cannibalistic group called the Dræu. Durango and his crew, including his lieutenant, Vienne and artificial intelligence implant Mimi, are bombarded throughout the novel with shrapnel, explosions and obstacles. Gill's young adult dystopian novel is just the beginning of Durango's adventures, with Gill's third book, *Invisible Sun* to be released in spring 2012.



Brutal Intimacy: Analyzing Contemporary French Cinema
Tim Palmer, associate professor of film studies

(Wesleyan, 2011)

"Surveying the film d'auteur of the last decade or so, *Brutal Intimacy* accomplishes something rare and noteworthy: to study contemporary art works with the critical distance of a cultural historian. This is truly a 'history of the present time.'"

— Alan Williams, Rutgers University

A survey of contemporary French cinema, Tim Palmer's *Brutal Intimacy* delves into the filmmaking industry in the nation where cinema was born. Palmer goes inside French filmmaking, analyzing both its growing populations of women and first-time filmmakers as well as renowned artists such as Olivier Assayas, Claire Denis and Gaspar Noé. Interviews and testimonials from leading filmmakers lend to Palmer's fascinating examination of French cinema in the 21st century.

The Night Train

Clyde Edgerton, professor of fiction
(Little, Brown and Company, 2011)

"The Night Train is classic Edgerton, with crackling wit and lines that make you laugh out loud – but also classic is the great, generous heart at its center that leaves the reader filled with hope and compassion."

— Jill McCorkle,
author of *Going Away Shoes*

Clyde Edgerton's newest novel follows two forbidden friends in small town North Carolina circa 1963. Larry Lime is a black teenager just learning to play piano from a man named The Bleeder, and Dwayne Hallston is the white son of a shop owner trying to get his band, the Amazing Rumbler, to sound just like James Brown. A mutual love of music and appreciation for teenage pranks and dancing chickens drives them together and forward with big dreams. Edgerton shines making readers laugh out loud while revisiting their sordid national history and reminding them to be hopeful in music, friendship and change.

The Ever-Evolving Enterprise

Stephen C. Harper, professor of management
(Praeger Books, 2011)

Professor Stephen C. Harper's book, *The Ever Evolving Enterprise: Guidelines for Creating Your Company's Future*, discusses how businesses can be ahead of the curve in today's constantly changing marketplace.

The book emphasizes the importance of using tactical strategies to prepare for the future, as Harper asserts that simply keeping up with the competition is no longer effective in the current economic climate. He suggests that success in business is contingent on a company's ability to improve efficiency and to provide higher quality products and/or services than the competition.

Harper points out that in this "new economy" most consumers have access to products and services that seemed inconceivable 20 years ago. He explains that revolutionary products and/or services can make the current market leaders obsolete, but cites that such an evolving market can also provide many opportunities for growth and invention.

Harper teaches readers how to stay abreast of market trends and how to take the precautions necessary to combat the negative forces that can impact a business. He notes the importance of anticipating and analyzing all of the competition's possible moves and being mindful of internal threats including a retrogressive management team.

Ultimately, the book warns readers that the future has no place for mediocrity and that success depends on experimentation and innovative thinking.

RE:SEARCH INTO RESILIENCY

by Kim Proukou '06M



UNCW/JAMIE MONCRIEF

Antonio Puente counsels a student at the Cape Fear Clinic in Wilmington

Antonio Puente spends his time – inside and outside the classroom – doing many things of serious value. He engages his students in research and seeks to further the knowledge of his discipline and its service to the wider community. Not only does Puente study the resiliency of a person to adapt to changes, he is an example of the resiliency of a person to adapt to changes.

As a licensed, practicing clinical neuropsychologist, Puente serves patients in Southeastern North Carolina. In addition to his professorship at UNCW, he holds visiting professorships at the Universidad de Granada (Spain), the University of California Los Angeles and the University of North Carolina Chapel Hill.

Puente founded and is co-director of the Mental Health Clinic at Cape Fear Clinic in Wilmington. He believes the practice of psychology should be integrated throughout the entire healthcare system.

Cape Fear Clinic serves close to 1,500 patients in a six-county area without regard for ethnicity, creed, insurance status or ability to pay. More than 300 volunteers, including doctors, nurses, dentists and pharmacists, augment the clinic's six professional staff. The Cape Fear Clinic, a comprehensive clinic, provides patients with free dental, medical, pharmaceutical and mental health care for acute and chronic conditions.

In August 2011, the American Psychological Association recognized Puente's work and awarded him with the 2011 American Psychological Award for Distinguished Professional Contributions in Independent Practice. On receiving this, Puente became only the second neuropsychologist and the first Hispanic to receive the award – the highest recognition granted by the association for the practice of psychology.

In his invited address, "Psychology as a Health Care Profession," Puente focused on the future of psychology and called for a reimagining of the practice of psychology within an integrated healthcare delivery system.

"We need to have integrated healthcare and take better advantage of the science of psychology, using the potential of the brain-mind to augment healing processes and begin to see psychology as a health profession – not exclusively or separately as a mental health profession," Puente says.

Puente owes his defining interest in brain-mind consciousness to Roger Wolcott Sperry – a Nobel laureate who Puente met while editing a series of books on neuropsychology – and to Sperry's tenet that the brain gives rise to consciousness. Puente has spent his career focused on the neurobiological-psychological functioning and the individual capacities for consciousness – the awareness necessary to apply one's mental abilities to present opportunities or difficulties.

"For example, if I am conscious of myself as resilient, then my brain is going to be situated where I am more likely to be flexible and able to adapt to situations. If I think I am inflexible, then I am not going to bend," Puente explains.

Puente assesses the characteristics, behaviors and adaptive resources that determine a person's resiliency. Puente wants to know how a person may change – or become more resilient – when faced with traumatic events or a serious illness. Within his study of resiliency, Puente researches the cultural neuropsychology (related to evolutionary psychology) of how social practices and cultural values shape deeper-level mental and brain processes. He then looks at how these might affect one's abilities of adaptation, redirection, acceptance and resiliency.



“I witness the fragility of life everyday. So, to me, everyday that I awake, I say, ‘I am so lucky. I better get busy and do something of serious value.’” One way UNCW professor of psychology Antonio Puente, a political immigrant born in Cuba, stays busy is with community outreach and his research.

Psychology students assist mental health providers at the Cape Fear Clinic

“Education is probably the biggest molder of cognitive and emotional ability in human beings, along with parental engagement,” Puente says. “We also know that culture is a means and source of well being, neuropsychological health and healing, through the transmission of sustaining values. And values have an effect on health and well-being.”

Noted as an international leader in test design, Puente has created neuropsychological tests – sensitive to one’s culture and suited to diverse users – that measure behavioral effects of certain kinds of brain damage, perception abilities, auditory

abilities, memory and visual-spatial ability in non-English speaking populations.

His interest as a researcher also has extended into the criminal justice system. Specifically, Puente is one of a handful of researchers worldwide looking at the neuropsychological features of Spanish-speaking murder defendants and death row inmates.

According to Puente, the questions that drive his research are “How is it that some people adapt and evolve? And, how is it that some do not have that capacity? Because it is rare to find people who just don’t want to.” ■

PROFESSOR STUDIES YOGA’S BENEFITS WITH LOW-INCOME PATIENTS

by Sally J. Johnson ’14MFA

Can the practice of yoga and meditation with traditional therapies help patients suffering from anxiety and depression? With the help of a **Richard Corbett** Research Award, professor **Nasrin Falsafi** of the UNC Wilmington College of Health and Human Services has begun a one-year study to find out.

Falsafi will conduct the research at a free clinic in Wilmington. A certified yoga instructor, psychiatric clinical specialist and certified holistic nurse, Falsafi has previously used yoga as a therapeutic tool in private practice. While employing holistic treatments alongside traditional psychotherapy treatments for her patients, she learned that yoga and mindfulness meditation were great complements to other therapies for patients suffering from anxiety and/or depression.

“Since anxiety and depression have effects on one’s body, it’s important to also treat the body and not use only psychotherapy and medications. Yoga is a meditative practice and can help the patients both physically and emotionally,” said Falsafi.

Low-income patients without insurance show a large need for these therapies and may have not had access to such practices. If the study shows the therapeutic yoga provides some relief, the patients will have a new, life-long and free treatment for themselves.

“It is easy to learn such practices, and after individuals learn the basics of these modalities, they can do it on their own. Once [the patients] have learned it, they’ve learned it,” she said.

Falsafi hopes this study will be the groundwork for future studies including research into how yoga and mindfulness meditation may help patients with Post-Traumatic Stress Disorder (PTSD), especially those returning from war, which is a population showing great need for these types of modalities.

Her one-year pilot study will involve 20 patients all suffering from anxiety and/or depression. Whether these men or women are currently taking or have previously taken medication or tried other therapies will be noted in Falsafi’s study, but nothing will change in their treatments except to add the meditation and easy yoga training taught by Falsafi. The participants will attend an eight-week training program. ■



Louise Oriole Burevitch is a Wilmington resident whose generosity often focuses on animal welfare programs and services that benefit disadvantaged children. Her contribution to the lab's construction and outfitting opened a new chapter for a variety of field research programs at UNCW, including the Marine Mammal Stranding Program, led by **Ann Pabst** and **Bill McLellan**, North Carolina State stranding coordinator.

NEW LAB FURTHERS RESEARCH ON MARINE MAMMAL STRANDINGS

by Andrea Monroe Weaver



Visitors honor Louise Oriole Burevitch at an open house at the Marine Mammal Stranding Lab

Thanks to a Wilmington resident's generosity, UNCW biology and marine biology students and faculty now have a unique lab specifically designed to support their research.

"The Oriole Burevitch Laboratory is the only lab of its kind with the primary goal of involving undergraduate students, as well as master's and Ph.D. students, in the investigation of marine mammal strandings," said **Ann Pabst**, professor, UNCW Department of Biology and Marine Biology.

Named for benefactor Louise Oriole Burevitch, "the lab is a boon to our field programs," said associate professor **Chris Finelli**, chair of the Department of Biology and Marine Biology.

"Our program has two core missions," Pabst said. "The first is to investigate strandings to improve our understanding of the biology of our local marine mammals so that we may enhance their conservation. The second is to educate students through their active participation in marine mammal stranding investigations."

The waters off North Carolina are host to the largest diversity of marine mammals along the East Coast, from resident populations of bottlenose dolphins to migratory porpoises, beaked whales and the critically endangered North Atlantic right whale. The state has the third highest marine mammal stranding rate (150 to 200 each year) on the East Coast. The

research that UNCW students and faculty conduct as part of the program advances worldwide knowledge about these marine mammals.

In 2010, an aerial reconnaissance team from this program documented the birth of a right whale. The resulting study, published in the journal *Marine Mammal Science*, expanded the scientific community's collective information about right whale calving practices.

Before the Burevitch Lab opened, students and faculty conducted necropsies to determine the cause of the animals' death in a parking lot behind Dobo Hall. They worked outside, often in harsh weather. There simply wasn't a laboratory on campus large enough to accommodate specimens the size of a whale or dolphin.

"This is a transformational gift," Pabst said. "UNCW has, at its core, the active engagement of students in scholarship. Whether our students are investigating the Cape Fear, our estuaries or our ocean, the Oriole Burevitch Laboratory will provide a new and critically needed facility to support those field activities."

The Burevitch Laboratory has stainless steel tables and counters that can be sloped and hosed down, as well as cement floors that flow toward central drains for easy cleaning. The labs

have garage doors, making it easier for students and faculty to load and unload equipment and specimens. The space dedicated to marine mammal research includes a ceiling-mounted crane to aid in lifting large specimens.

"It's a utilitarian space, and it is exactly what we needed!" Pabst said.

In addition to marine mammal research, the Burevitch Laboratory will also support other active research programs in biology and marine biology, including the spawning, feeding and migration of several important commercial and recreational fish species to provide data to resource managers in the region.

One project that will take particular advantage of the Burevitch Laboratory is focused on the feeding habits of large pelagic fishes, such as billfishes, tunas, wahoo and dolphinfish off the N.C. coast. Despite their central role as consumers and their high economic value, researchers lack basic information on these species. The project is a collaborative effort between fishery scientists at UNCW and recreational fishers to collect stomach contents and tissue samples to determine feeding location and preferences of these important predators. ■

The UNCW Marine Mammal Stranding Program

www.uncw.edu/mmmsp

Directors

Bill McLellan, North Carolina State Stranding Coordinator

D. Ann Pabst, UNCW professor of biology and marine biology

State and Regional Educational and Research Partners

Duke University

N.C. State University

National Marine Fisheries Service

National Park Service

N.C. Aquariums

N.C. Division of Marine Fisheries

N.C. Maritime Museum

N.C. Wildlife Resources Commission

Virginia Marine Science Museum

Recent Graduates

Michelle Barbieri '02, '05M – Graduated in 2011 with a doctorate in veterinary medicine from the University of California Davis and recipient of the 2011 F.G. Wood Award for Best Student Paper, based on her UNCW master's research, published in *Marine Mammal Science*

Erin Fougères '01M, '08PhD – NOAA Southeast Stranding Program administrator, National Marine Fisheries Service, St. Petersburg, Fla. NOAA Employee of the Year for the Southeast for her work in the Gulf of Mexico following the Deepwater Horizon oil spill

Louise Oriole Burevitch's gift to support construction of a new biology and marine biology laboratory was part of *The Campaign for UNCW: Soaring to Greatness*, a fundraising initiative to increase support for all aspects of the university's mission. The university raised more than \$66 million in the campaign. www.uncw.edu/advancement/campaign



FARM BUREAU DONATION FURTHERS SHELLFISH RESEARCH

The New Hanover County Farm Bureau donated \$10,300 to support UNC Wilmington's efforts to promote aquaculture and preserve the state's shellfish population.

"The Farm Bureau's generous donation will provide much needed support for the evaluation of the growth and survival of oysters produced by the Shellfish Research Hatchery this season," said **Ami Wilbur**, hatchery director.

Using filtered seawater from the Atlantic Ocean, the hatchery's researchers can raise oysters from larvae to adulthood, giving researchers the opportunity to study shellfish throughout their life cycle. Wilbur said the Farm Bureau's gift will help to further develop hatchery techniques.

"Specifically, the funds will be used to purchase the necessary cages and to support the student researchers who will conduct much of the evaluation. This field-testing of the hatchery oysters is a critical step that will allow us to move forward with the research that will contribute to North Carolina's growing shellfish aquaculture industry," said Wilbur. ■



SPRING BREAK IN BERMUDA

by Tara Midyett Hardy '12

Every college student dreams of spending spring break in a tropical paradise. Who wouldn't want to spend a week swimming through crystal clear water, snorkeling with thousands of colorful and exotic fish and studying one of the richest maritime ecosystems in the world?

Thanks to a donation from the Gillings family, students at the University of North Carolina Wilmington can afford to travel to Bermuda and study at the island's Institute of Biological Sciences.

In March 2011, eight UNCW students and two faculty members arrived at the airport in St. George, the northern island of Bermuda, to take part in a 10-day field course at the Bermuda Institute of Biological Sciences. The complex consists of white buildings with views overlooking Ferry Reach, the channel that separates St. George's Island from the rest of Bermuda.

"The Bermuda trip was a once-in-a-lifetime experience that I will not soon forget," said **Jennifer Idol '11**, a UNCW graduate student. "I encourage anyone who has an opportunity such as this to grab it."

The course is part of an exchange program between UNCW's Center for Marine Science and the University of Southampton's School of Ocean and Earth Science in the UK. Students and faculty from both universities come together for this exciting opportunity to study one of the ocean's most unique ecosystems.

"One of my favorite parts of the trip was getting to meet the students from Southampton," said Idol. "It's always an interesting experience working with scientists from other countries because often they have fresh ideas and different ways of doing similar things that can advance or expand your own methods."

For the past six years, this trip has been made possible through generous donations by the Gillings family. UNCW and Southampton each have excellent field programs that complement each other well for students who participate in the international exchange program. An annual gift of \$50,000 to both UNCW and Southampton allows students and faculty to collaborate for the field-based workshop in Bermuda.

Each student on the trip was expected to select a specific research topic, collect their

own samples and measurements, calculate statistics based on their findings, and present their results orally and in writing. This experience is designed to give students a first-hand look at the professional life of a field researcher.

"Hours of work were put in every day developing a research question and hypothesis," said **Heather Page '11**. "It was definitely a challenge when dealing with the wacky technology of the Bermuda Triangle.... Internet was lost for a day and several digital cameras broke."

The trip includes a variety of other experiences outside of the research lab. Students were able to tour a research vessel, take a whale watching trip and go sightseeing in the local community.

"We had the opportunity to snorkel several of Bermuda's beautiful ecosystems, including mangroves, coral reefs, and sea grass beds," said Page. "I can still picture the sights clearly in my head even ten months later." This year, another group of students will travel to Bermuda for this one-of-a-kind experience. ■

MARBIONC FACILITY WILL BRING TOGETHER THE UNIVERSITY AND MARKETPLACE

by Sally J. Johnson '14MFA

Under the roof of a new two-story, 70,000-square-foot building along the Atlantic Intracoastal Waterway, a partnership between university and industry researchers, technicians and technologists will take food, energy and health solutions from investigation to innovation.

Marine Biotechnology in North Carolina (MARBIONC), the University of North Carolina Wilmington's state-supported economic development program for marine biotechnology research and development, will occupy a portion of the new facility's labs and offices. The remaining space will be leased to public and private groups interested in developing natural marine-based products for a wide variety of uses.

The new MARBIONC research and development facility will translate discovery into development and deliver new pharmaceuticals, food sources, renewable energy technologies and environmental solutions from the sea – advancing the quality of life and sustaining economic development in the region. With its exceptional research personnel, oceanic equipment and technology and prime East Coast location, UNCW is positioned to be a leader in the marine biotechnology field.

The facility, which will be located on the campus of UNCW's Center for Marine Science (CMS), will enable academic researchers and industry experts to consult on breaking scientific discoveries and develop applications in concert, cutting down the time it takes for an invention to move from the laboratory to the marketplace.

The \$30 million building, partially funded by a federal American Recovery and Reinvestment Act matching grant, is expected to house more than 100 short- and long-term tenants from varying fields, including marine science, biochemistry, organic chemistry, law, business, immunology, mariculture and pharmacology.

The facility is billed as a marine biotechnology answer to the Raleigh-area Research Triangle Park, a project created by a state-university-public partnership in the 1950s that is now home to multiple research



Artist Illustration of the MARBIONC Building

and development firms and Fortune 500 corporations. The university hopes it will serve as a regional hub for turning marine-based research into business applications.

Lab and office space will be organized by module, giving occupants the opportunity to rent more or less adjacent space easily. Each lab will be equipped with drop ceiling utilities to optimize the building's modular floor plan, and geothermal heating and air will keep it at a constant temperature, a necessity for delicate laboratory work.

Of further benefit is each tenant's close proximity to the CMS core facilities, which will provide DNA sequencing, nuclear magnetic resonance and mass spectroscopy, nutrient analysis, running seawater, stable isotope mass spectrometry, marine micro-organism culture collections and more to MARBIONC-based firms and researchers.

"The building was designed by scientists for scientists," said **Daniel Baden**, director of the Center for Marine Science.

Economic development opportunities spurred by business partnerships formed in this space should benefit the job market in Southeastern North Carolina.

"The building is expected to attract local, state, national and international organizations," said **Steve Fontana**, MARBIONC senior development technology officer.

"For every new job that goes in the building, we are expected to create 1.5 to 2 new

jobs in the community."

The field of marine biotechnology is expected to grow by more than 10 percent annually. Although terrestrial drug discovery is ongoing, it is only in recent years that scientists have turned to oceanic habitats in search of natural products.

"With MARBIONC, we are seeking to answer the question of how to translate science into products helpful to society – how to move a discovery into industry where it is useful," said Baden. "Scientific research money comes from tax dollars, and federal and state agencies want to show what the public gets back for what we do."

MARBIONC's resources include cultured phytoplankton subclasses used to design drugs with enhanced pharmacological properties. Among them is *Karenia brevis*, the marine dinoflagellate responsible for red tide is expected by marine biologists to have multiple potential pharmaceutical applications. Another novel marine compound, discovered by MARBIONC's director of research **Jeffrey Wright**, is being evaluated as an antiviral drug. ■

Those interested in partnering with UNCW and MARBIONC should contact Steve Fontana at 910.962.2330.



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The National Geographic Explorer research vessel cruises past Adelie penguins of Antarctica ►

Biology professor **Steve Emslie** has traveled to the southernmost continent since 1992 to perform stable isotope analysis on the diet of Antarctic penguins to track warming trends. Populations of the Adelie penguins have declined as temperatures have risen at the South Pole due to climate change.

www.uncw.edu/penguins



■ DELVE INTO UNCW'S CARIBBEAN RESEARCH &
INSTRUCTIONAL PORTFOLIO, LOCATED INSIDE.

